UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/541,159	03/31/2000	Tao Kai Lam	(E30-043)-99-202	3415

7590 10/08/2003	EXAMINER
GEORGE A. HERBSTER	CHU, KIM KWOK

ART UNIT	PAPER NUMBER
2653	10

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DATE MAILED: 10/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *Amendment filed on 7/14/03 (paper 9)* .

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *23-28* is/are allowed.

6)☒ Claim(s) *1-6,8-10 and 19-22* is/are rejected.

7)☒ Claim(s) *7 and 11-18* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

   If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a)☐ All b)☐ Some * c)☐ None of:

   1.☐ Certified copies of the priority documents have been received.

   2.☐ Certified copies of the priority documents have been received in Application No. _____ .

   3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
   * See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

   a)☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)   4)☐ Interview Summary (PTO-413) Paper No(s). _____ .
2)☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)   5)☐ Notice of Informal Patent Application (PTO-152)
3)☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .   6)☐ Other: .

Response to Remarks

1.   Applicant's Remarks filed on July 14, 2003 have been fully

considered but they are not persuasive.

   (a)   Applicant states that the prior art of Satoh does not

calculate the actual seek time (page 13 of the Remark, line 1).

Accordingly, Applicant's claim 1 does not claim the actual seek

time which is used to drive the disk head from a starting

location to a destination.   Applicant claims "generating a seek

time" for disk head movement.   Similarly, Satoh also teaches

the generating of a seek time based on the interpolation of

seek distance (Fig. 5).   Furthermore, Satoh teaches a seek time

window which determines the time required for moving a disk

head between two locations as in Applicant's claim 1, lines 1

and 2; and

   (b)   Applicant states that the prior art of Satoh does not

disclose segments of the type in the claim because there are no

first and second boundaries for a single track (page 15 of the

Remark, lines 3-6).   Accordingly, segments such as zones and

sectors are inherent data storage locations in a disk such as

Satoh's.

Claim Rejections - 35 USC § 103

2.   The following is a quotation of 35 U.S.C. § 103(a) which

forms the basis for all obviousness rejections set forth in

this Office action:

> *(a) A patent may not be obtained though the invention is not*
> *identically disclosed or described as set forth in section*
> *102 of this title, if the differences between the subject*
> *matter sought to be patented and the prior art are such that*
> *the subject matter as a whole would have been obvious at the*
> *time the invention was made to a person having ordinary*
> *skill in the art to which the subject matter pertains.*
> *Patentability shall not be negatived by the manner in which*
> *the invention was made.*

3.   Claims 1-6 and 8 are rejected under 35 U.S.C. 103(a) as

being unpatentable over Satoh (U.S. Patent 5,696,646) in view

Nakano et al. (U.S. Patent 5,313,617).

Satoh teaches a method of calculating a seek time very

similar to that of the present invention. For example, Satoh

teaches the following:

(a) as in claim 1, moving a disk head between first and

second addresses on a physical disk drive (Fig. 6; step 1;

column 2, lines 37-40);

(b) as in claim 1, establishing an array of seek times for

seek operations between each segment pair based upon the first

and second boundaries (Fig. 7; table 86 stores seek times);

(c) as in claim 1, generating a seek time for disk head

movement between the first and second addresses by

interpolating the array based upon the first and second

addresses (Figs. 4 and 7; step 84 generates seek time by

interpolating; column 6, liens 55-58, column 9, lines 25-41);

(d)   as in claim 3, the segment boundaries and first and

second addresses are independent of each other and wherein the

seek time generation uses the first and second addresses as

reference locations in each of the logical blocks (Fig. 3;

column 5, lines 61-67);

(e)   as in claim 5, the seek time generation includes the

step of generating a linear interpolation based upon the

location of the first and second addresses relative to the

segment boundaries (Fig. 5);

(f)   as in claim 6. the linear interpolation is based upon

ratio analysis (Fig. 5; column 7, lines 6-20, equation 2); and

(g)   as in claim 8, the physical disk drive includes a

data block and the interpolation uses the boundaries of the

data block to obtain a disk seek time for seek operations

within the data block (Fig. 5; boundaries of the data block is

defined by the addresses).

However, Satoh not teaches the following:

(a)   as in claim 1, dividing the disk into a plurality of

segments(volumes), each segment having a given size and being

defined by first and second boundaries;

(b)   as in claim 2, the segment division includes dividing

the physical disk drive into segments of equal size; and

(c)   as in claim 4, each reference (address) is given
relative to a predetermined position on the physical disk
drive.

Nakano teaches a data storage system having above
features.   For example, Nakano teaches the following:

(a)   as in claim 1, dividing the disk into a plurality of
segments (volumes), each segment having a given size and being
defined by first and second boundaries (Fig. 3); and

(b)   as in claim 2, the segment division includes dividing
the physical disk drive into segments of equal size (Fig. 3);

(c)   as in claim 4, each reference (address) is given
relative to a predetermined position on the physical disk drive
(Fig. 3).

An information storage medium should be partitioned first
so that addresses can be created accordingly for data
allocation.   Although Satoh's disk system does not disclose
that the disk are divided into a plurality of volumes each with
equal size and reference addresses, however, for the advantage
of grouping information, it would have been obvious to one of
ordinary skill in the art at the time of invention to divided
Satoh's disk into several volumes each with equal size and
reference addresses such as Nakano's, because information which
is managed under one volume can be searched and addressed more
effectively.

4.   Claims 9, 10 and 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Satoh (U.S. Patent 5,696,646) in view of Nakano et al (U.S. Patent 5,313,617).

Satoh teaches a method for determining the seek time for a physical disk very similar to that of the prevent invention. For example, Satoh teaches the following:

(a)   as in claim 9, determining seek times for seek operations between the segments (Fig. 7; table 86 stores seek times),

(b)   as in claim 9, accumulating statistics for each access to each logical volume during the time interval (Fig. 7; table 86 stores seek times statistics),

(c)   as in clam 9, converting the accumulated statistics into an estimated number of seeks between each pair of logical volumes (Fig. 5, interpolation);

(d)   as in claim 9, defining a seek time for each logical volume pair based upon the segment seek times (Figs. 4 and 7; step 84 generates seek time by interpolating; column 6, lines 55-58, column 9, lines 25-41);

(e)   as in claim 9, generating a total seek time as the sum of the products, for each logical volume pair, of the seek time for and the estimated number of seeks between each logical volume in the logical volume pair (Fig. 5; interpolation);

(f)   as in claim 10, assigning a predetermined seek time

for each seek operation between two segment boundaries (Fig. 5,

the two boundaries are A and B);

(g)   as in claim 10, calculating an intrasegment seek time

based upon the predetermined seek times (Fig. 5; interpolation

calculation between two addresses);

(h)   as in claim 19, determining the time for a seek

operation within a logical volume (Fig. 5; interpolation);

(i)   as in claim 20, determination of intra-volume seek

time for a logical volume includes defining the boundaries of

the logical volume relative to the segment boundaries and

determining the seek time between the logical volume

boundaries (Fig. 5; interpolation);

(h)   as in claim 21, the definition of intra-volume seek

time includes interpolating the seek times determined for seek

operations between the segments based upon the logical volume

boundary locations (Fig. 5, seek time with interpolation

calculation); and

(i)   as in claim 22, the definition of seek time includes

the step of linearly interpolating the seek times determined

for seek operations between the segments based upon the logical

volume boundary locations (Fig. 5, seek time with interpolation

calculation).

However, Satoh not teaches the following:

(a)   as in claim 9, the disk is configured to store data

in a plurality of logical volumes over a time interval;

(b)   as in claim 9, dividing the physical disk into a

plurality of fixed sized segments independently of the logical

volume configuration on the physical disk drive,

Nakano teaches a data storage system having above

features.   For example, Nakano teaches the following:

(a)   as in claim 9, the disk is configured to store data

in a plurality of logical volumes over a time interval (Fig.

3);

(b)   as in claim 9, dividing the physical disk into a

plurality of fixed sized segments independently of the logical

volume configuration on the physical disk drive (Fig. 3);

An information storage medium should be partitioned into a

plurality of logical volumes with fixed sized segments so that

addresses can be created accordingly for data allocation.

Although Satoh's disk system does not disclose that the disk

are divided into a plurality of volumes with equal size

segments, however, for the advantage of grouping information,

it would have been obvious to one of ordinary skill in the art

at the time of invention to divided Satoh's disk into several

volumes with fixed segments such as Nakano's, because

information recorded in fixed segments within one individual

volume can be searched and addressed more effectively over a time interval.

Allowable Subject Matter

5.   Claims 23-28 are allowable over prior art.

6.   Claims 7 and 11-18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7.   The following is an Examiner's statement of reasons for the indication of allowable subject matter:

As in claim 7, the prior art of record fails to teach or fairly suggest that the physical disk drive includes a plurality of data blocks and the interpolation uses a center location for each data block as the reference location to obtain disk seek times for disk seek operations between different data blocks.

As in claim 11, the prior art of record fails to teach or fairly suggest that the seek time determination includes the step of placing the predetermined seek times in a two-dimensional array with the rows and columns defined by the segment boundaries.

As in claim 12, the prior art of record fails to teach or fairly suggest that the accumulation of statistics includes segregating each access to a logical volume into one of predetermined classes of accesses and weighting the numbers of accesses in each predetermined class.

As in claim 15, the prior art of record fails to teach or fairly suggest that the definition of seek time comprises determining the seek time between a center location of each of the logical volumes in the logical volume pair.

As in claims 23 and 26, the prior art of record fails to teach or fairly suggest that a step of converting the accumulated statistics into an estimated number of seeks between each pair of logical volumes by weighting the numbers of accesses in each of different predetermined classes.

The features indicated above, in combination with the other elements of the claims, are not anticipated by, nor made obvious over, the prior art of record.

Conclusion

8.   The prior art made of record and not relied upon is

considered pertinent to applicant's disclosure.

Hamaguchi et al. (6,515,817) is pertinent because

Hamaguchi teaches a seek time based on interpolation of

disturbance compensation parameters.

Carlson (6,493,175) is pertinent because Carlson teaches

an interpolation method to compensate run-out errors.

Pham et al. (5,886,846) is pertinent because Pham teaches

an interpolation method to compensate run-out errors.

Arai et al. (5,381,282) is pertinent because Arai teaches

an estimation of head velocity by interpolation.

*9.   THIS ACTION IS MADE FINAL.   Applicant is reminded of the
extension of time policy as set forth in 37 CFR 1.136(a).
A shortened statutory period for reply to this final action is
set to expire THREE MONTHS from the mailing date of this
action.   In the event a first reply is filed within TWO MONTHS
of the mailing date of this final action and the advisory
action is not mailed until after the end of the THREE-MONTH
shortened statutory period, then the shortened statutory period
will expire on the date the advisory action is mailed, and any
extension fee pursuant to 37 CFR 1.136(a) will be calculated
from the mailing date of the advisory action.   In no event,
however, will the statutory period for reply expire later than
SIX MONTHS from the mailing date of this final action*

10. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks Washington, D.C.
20231 Or faxed to:

(703) 872-9314   (for formal communications intended for
entry. Or:

(703) 746-6909,   (for informal or draft communications,
please label "PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park
II, 2021 Crystal Drive, Arlington. VA., Sixth Floor
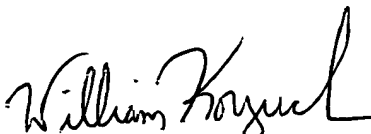(Receptionist).

Any inquiry of a general nature or relating to the status
of this application should be directed to the Group
receptionist whose telephone number is (703) 305-4700.

Any inquiry concerning this communication or earlier
communications from the examiner should be directed to Kim CHU
whose telephone number is (703) 305-3032 between 9:30 am to
6:00 pm, Monday to Friday.

Kim-Kwok CHU
Examiner AU2653
October 3, 2003

(703) 305-3032

WILLIAM KORZUCH
SUPERVISORY PATENT EXAMINER
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